Requested Patent: EP0571961A1

Title:

A BOGIE FOR A RAILWAY VEHICLE WITH DRIVE MOTORS AND REDUCTION UNITS SUSPENDED FROM THE CHASSIS ;

Abstracted Patent: EP0571961 ;

Publication Date: 1993-12-01 ;

Inventor(s): CHIODI GIUSEPPE (IT) ;

Applicant(s): CHIODI GIUSEPPE (IT) ;

Application Number: EP19930108449 19930525 ;

Priority Number(s): IT1992TO00448 19920526 ;

IPC Classification: B61F3/16; B61F3/04; B61C9/50 ;

Equivalents: DE69312803D, DE69312803T, IT1257195 ;

ABSTRACT:

The bogie includes a chassis (5) comprising two U-shaped longitudinal members (6) each connected by means of a pin (7) to a structure (8) supporting the axle (9) of a wheel (10). A primary suspension assembly (11) for the bogie is arranged between the chassis (5) and the structure (8). The drive motor (12) for the wheel (10) is mounted on the structure (8) so that its centre of gravity lies substantially on the axis of the pin (7). The structure (8) also carries a speed reducer (20) for transmitting the drive from the motor (12) to the wheel (10).

(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 571 961 A1**

(12) EUROPEAN PATENT APPLICATION

(21) Application number: **93108449.5**

(22) Date of filing: **25.05.93**

(51) Int. Cl.5: **B61F 3/16**, B61F 3/04, B61C 9/50

(30) Priority: **26.05.92 IT TO920448**

(43) Date of publication of application: **01.12.93 Bulletin 93/48**

(84) Designated Contracting States: **AT BE CH DE DK ES FR GB GR IT LI LU NL SE**

(71) Applicant: **Chiodi, Giuseppe**
Via dello Storno, 16
I-20147 Milano(IT)

(72) Inventor: **Chiodi, Giuseppe**
Via dello Storno, 16
I-20147 Milano(IT)

(74) Representative: **Jorio, Paolo et al**
Studio Torta,
Via Viotti, 9
I-10121 Torino (IT)

(54) A bogie for a railway vehicle with drive motors and reduction units suspended from the chassis.

(57) The bogie includes a chassis (5) comprising two U-shaped longitudinal members (6) each connected by means of a pin (7) to a structure (8) supporting the axle (9) of a wheel (10). A primary suspension assembly (11) for the bogie is arranged between the chassis (5) and the structure (8). The drive motor (12) for the wheel (10) is mounted on the structure (8) so that its centre of gravity lies substantially on the axis of the pin (7). The structure (8) also carries a speed reducer (20) for transmitting the drive from the motor (12) to the wheel (10).

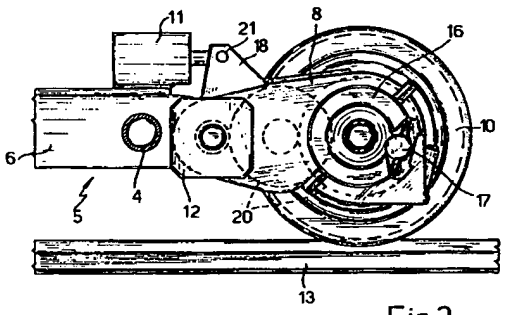

Fig.2

EP 0 571 961 A1

The present invention relates to a bogie for railway vehicles, including vehicles for light or conventional metropolitan networks.

In railway vehicles it is important to reduce that portion of the weight of the bogie which bears directly on the wheels without interposed resilient suspension means, that is, to reduce the non-suspended weight of the bogie. In fact, as this weight increases, the bogie becomes more aggressive towards the tracks, increasing the stresses and vibrations transmitted to the latter when a train passes.

This problem is more serious in the case of drive bogies, in which the weight of the bogie itself is increased by the presence of a motor, for example an electric motor, and the transmission required to transmit the drive from the motor to the wheels. Such a transmission normally includes a reduction unit and one or more couplings operable to compensate for relative movements between the motor and the axles.

In order to reduce the aggressiveness of the drive bogie towards the track, bogies have been proposed which have their motors entirely suspended from the bogie chassis, but have the weight of the reduction unit bearing on the axle. Other prior art arrangements provide for the reduction unit to be entirely suspended from the bogie chassis. However these arrangements involve a complicated drive transmission between the reduction unit and the axle/wheel assembly.

The object of the invention is to provide a bogie for railway vehicles which is extremely simple and safe in operation, and eliminates the disadvantages of prior art bogies listed above.

This object is achieved by the bogie for railway vehicles according to the invention, which includes a rigid chassis, at least two pairs of wheels with each wheel fixed to a corresponding axle, at least one of the wheels being driven by a corresponding drive motor, and which also includes resilient suspension means between the chassis and the axles, and is characterised in that a structure is provided between the chassis and the axle of the at least one driven wheel, the structure being mounted by means of an articulation pin on the chassis and connected thereto by the suspension means, the said motor being arranged with its centre of gravity lying substantially on the axis of the articulation pin.

Such a bogie achieves the result of carrying the weight of the drive motor, or motors, so that they are entirely suspended while a considerable portion of the weight of the reduction unit is also suspended so that the transmission means do not have to absorb relative movements between the axle and the chassis due to the primary suspension of the bogie.

The invention thus simplifies the problem, enabling the motor to be entirely suspended, the reduction unit to be semi-suspended and the drive to be transmitted directly from the motor to the reduction unit and from this to the wheel.

In order to provide a clearer understanding of the invention, a preferred embodiment of the bogie is described here, purely by way of example and with the assistance of the appended drawings, in which:

Figure 1 is a partial plan view of a railway bogie according to the invention; and

Figure 2 is a section taken on the line II-II of Figure 1.

With reference to Figure 1, the chassis of a railway bogie is generally indicated 5 and includes a pair of robust symmetrical longitudinal members 6, of inverted-U shape, of which only part of one is visible in the drawings. The longitudinal members 6 are connected to each other by at least two cross-members 4, each of which may be shaped, for example, like a tubular bar.

The bogie includes two pairs of wheels 10. One end of a longitudinal member 6 is illustrated schematically in the drawings and a structure 8, commonly known as a "reduction unit" and which acts as a wishbone, is fixed to the said end by means of an articulation pin 7. The structure 8 encloses a speed reducer 20 and houses bearings 14 and 15 carrying an axle 9 on which a wheel 10 is mounted. In the example illustrated, the two wheels 10 are therefore independent. This is particularly useful both for high-speed railway vehicles and for vehicles for city and suburban lines which are often required to travel on tortuous networks.

In fact, for high-speed vehicles, the independent wheels 10 avoid the risk of snaking movements caused by the cone angle of the wheel rims and therefore avoid any resulting transverse instability of the bogie. In vehicles for city or suburban lines, which have curves of a small radius, often down to 15 metres, bogies with independent wheels 10 eliminate the anti-steering effect of the axle 9, which is due to the different developments of the inner and outer tracks 13, and therefore any longitudinal slippage between the wheels 10 and tracks 13. In this way, any annoying flats are eliminated from the rolling face of the wheel, thus reducing the need for expensive re-turning of the wheels 10.

A brake disc 16 is securely fixed to one end of the axle 9, in the case described the axle 9 inwards of the chassis 5. A brake calliper 17, acting on the disc 16, is carried by the structure 8. The usual primary suspension assembly for the bogie, generally indicated 11, is also fixed to the ends of the longitudinal members 6. The assembly 11 includes, in particular, resilient suspension means of any

type, operable to ensure the optimum suspension of the vehicle and acting through a fulcrum 21 on an arm 18 fixed to the structure 8.

In addition, a drive motor 12 for the wheel 10 is mounted on the side of the structure 8 (Figure 1), its position being fixed so that its axis of rotation, on which its centre of gravity also lies, coincides with the axis of the pin 7 articulating the chassis 5 to the structure 8. The speed reducer 20 is operable to reduce and transmit the rotation from the shaft of the motor 12 to the axle 9 and thereby to the wheel 10. Therefore the weight of the motor 12 bears only on the primary suspension 11. In addition, the need is eliminated for any devices on the bogie to compensate for any relative movements between the motor 12 and the wheel 10 due to the primary suspension.

The advantages of the bogie of the invention over prior art bogies will be apparent from the above description. In fact, as the centre of gravity of the motor 12 lies on the axis of articulation of the structure 8, the weight of the motor 12 does not bear on the axle 9 and therefore its mass does not have to follow the relative movement of the wheel 10 caused by the suspension.

In addition, the fact that the geared drive transmission unit is carried by the same structure 8 as that which supports the motor 12, eliminates the need for devices to compensate for relative movements. Finally, the structure 8 is perfectly adapted for the independent drive of each wheel 10 of the bogie, thereby satisfying the requirements of high-speed vehicles and those of suburban vehicles.

It is clear that alterations and improvements may be made to the bogie described without departing from the scope of the present invention.

Claims

1. A bogie for railway vehicles, including a rigid chassis (5), at least two pairs of wheels (10) with each wheel fixed to a corresponding axle (9), at least one of the wheels (10) being driven by a corresponding drive motor (12), and including resilient suspension means (11) between the chassis (5) and the axle (9), characterised in that a structure (8) is provided between the chassis (5) and the axle of the at least one driven wheel (9), the structure (8) being mounted by means of an articulation pin (7) on the chassis (5) and connected thereto by the suspension means (11), the said motor (12) being positioned with its centre of gravity lying substantially on the axis of the articulation pin (7).

2. A bogie according to Claim 1, characterised in that means (20) for transmitting drive from the motor (12) to the axle (9) are also mounted on the said structure (8).

3. A bogie according to Claim 2, characterised in that the said structure (8) includes a brake assembly (17) operable to act on a brake disc (16) fixed to the axle (9).

4. A bogie according to Claim 3, characterised in that the structure (8) and the primary suspension means (11) are interconnected through a fulcrum element (21).

5. A bogie according to any one of the preceding Claims, characterised in that the said structure (8) supports an axle (9) on which a corresponding wheel (10) is fixed, the wheels (10) of a pair being driven by independent motors (12).

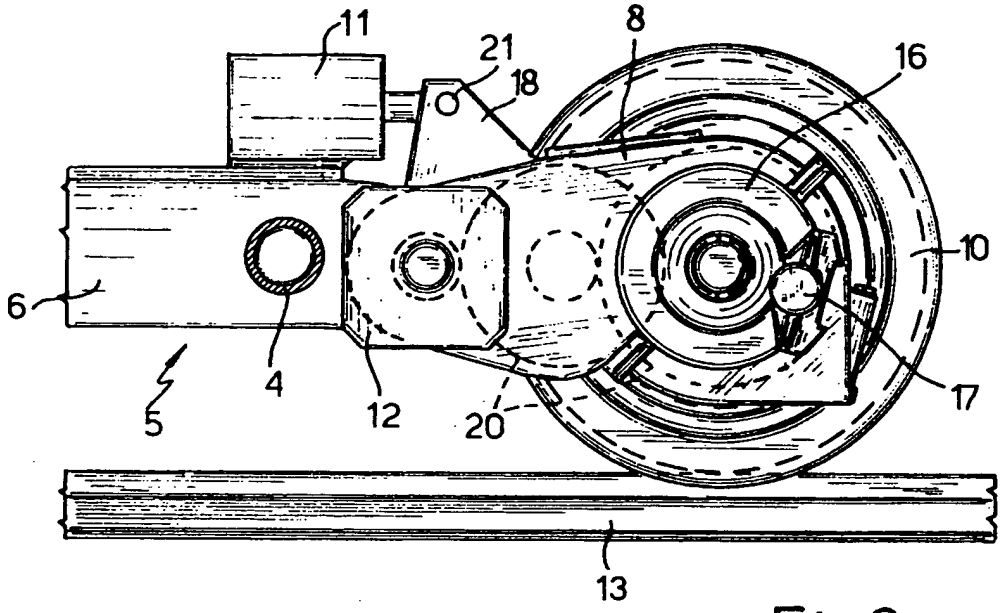
11
21
18
8
16
10
6
4
5
12
20
17
13

Fig. 2

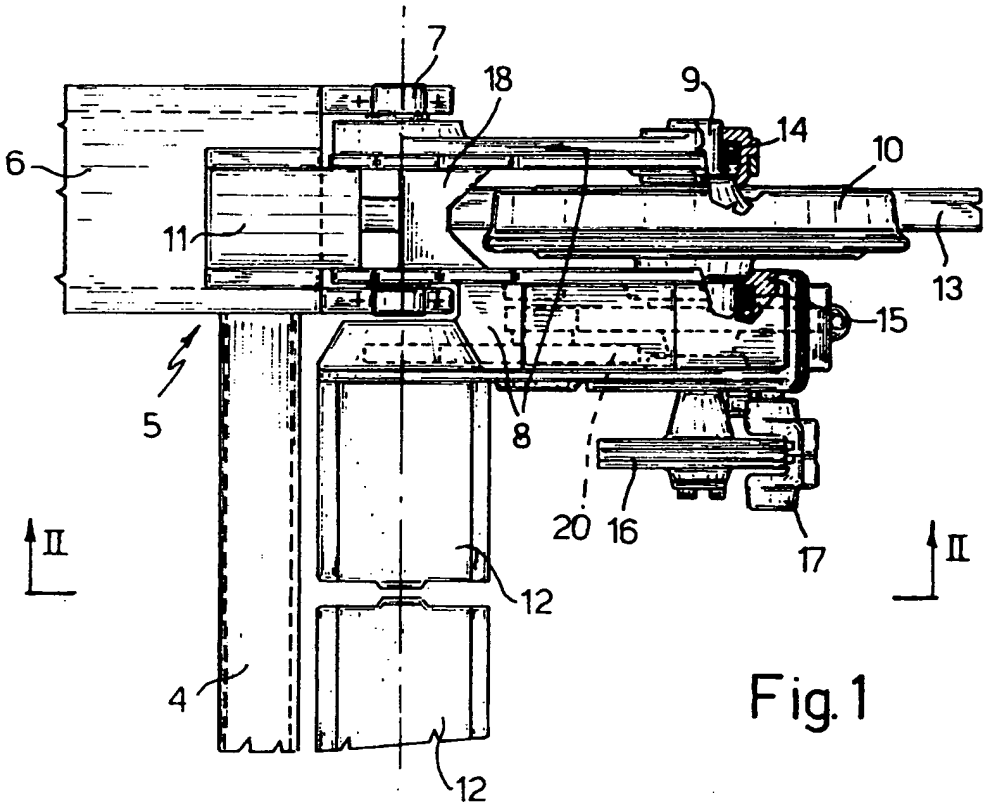
7
18
9
14
10
6
11
13
15
5
8
20
16
17
II
II
12
4
12

Fig. 1

European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 93 10 8449

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X	EP-A-0 384 512 (SO.C.I.MI SOCIETA COSTRUZIONI INDUSTRIALI MILANO S. P. A.) * the whole document *	1	B61F3/16 B61F3/04 B61C9/50
A		2-5	

X	EP-A-0 465 346 (GEC ALSTHOM SA) * column 3, line 48 - column 6, line 9; figures 1-7 *	1	
A		2-5	

X	DE-A-2 910 392 (THYSSEN INDUSTRIE AG) * page 5, paragraph 2 -paragraph 4 * * page 7, line 11 - line 29; figure 1 *	1	
A		2,3,5	

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

B61F
B61C
B61D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	25 AUGUST 1993	P. CHLOSTA

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P0401)